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NEUROPTEROUS INSECTS COLLECTED BY DR. A. DONALDSON SMITH IN
NORTHEASTERN AFRICA.

BY PHILIP P. CALVERT, PH.D.

Dr. A. Donaldson Smith, of Philadelphia, in his expedition through Somaliland and Gallaland to Lake Rudolph, collected some Neuroptera which he presented to the Academy of Natural Sciences of Philadelphia. These, some twenty-seven specimens, embrace thirteen species of Odonata, three of Planipennia, and one Termite; among them are two new species and one new genus of Odonata. This fact, together with the very slight information hitherto existing on the fauna of the region, justifies the publication of the present paper.

Dr. Smith has published a narrative¹ of his journey, accompanied by excellent maps, and since his Neuroptera are individually labelled and dated, it is possible, by reference to his book, to determine exactly the geographical positions and the elevations of the localities whence his specimens came. The care thus taken to record precise information deserves special mention, since not all recent travellers, in Africa or elsewhere, have been so painstaking.

Dr. Smith left Berbera, on the Gulf of Aden, July 10, 1894; reached Lake Rudolph in July, 1895; thence turned southeastwardly to the Tana river and Lamu on the Indian Ocean, at which latter he arrived about October 26, 1895. His Neuroptera were collected at the following places:

Berbera, on the Gulf of Aden, *Onychogomphus* sp., *Hemianax ephippiger*, *Crocothemis erythræa*, *Orthetrum brachiale* and *O. Sabina*, July 4 and 5, 1894;

Lafarok (map) or Lafarug (text, p. 16), about thirty miles to the southwest of Berbera, *Crocothemis erythræa*, July 13, 1894;

The Haud, a plateau with an elevation of 3,000 feet and more,

¹ Through Unknown African Countries. By A. Donaldson Smith. Edward Arnold, London and New York, 1897.

lying between 8° and 10° N. and 43° and 46° E., *Palpares* sp. No. 2, July 24, 1894.

"Lammo, Aug. 12, 1894," on *Palpares* sp. No. 1, is, I suppose, Tug Lummo, of page 28, Tug Lomo of the map, sheet 1. "Tug" is the Somali name for the sandy bed of a stream (p. 16). Dr. Smith crossed Tug Lammo in approximately $42^{\circ} 41' 40''$ E., $7^{\circ} 45'$ N.

Stony brook, a tributary of the Erer river, mentioned by Dr. Smith on p. 32, lies in $42^{\circ} 7'$ E., $7^{\circ} 35'$ N. Its elevation at two points visited August 16 and 18 is respectively 3,350 and 2,650 feet (see map). *Trithemis ardens* and *Pseudomacromia Donaldsoni*, August 17, 1894.

"Smith river, Sept. 11, 1894," attached to a *Palpopleura Portia*, I cannot find mentioned in the text or on the map. The latter shows Dr. Smith to have been at Roko, $41^{\circ} 52'$ E., $7^{\circ} 33'$ N., 3,870 feet elevation, on that date.

Sheikh Husein (p. 43), $7^{\circ} 43' 32''$ N., $40^{\circ} 44' 30''$ E., elevation 5,020 feet, *Enallagma* sp., *Pantala flavescens*, *Hemistigmoides deceptor*, *Sympetrum Fonscolombii*, late September and early October, 1894.

Walenso, a peak, 8,420 feet high, of the Gillette mountains, $40^{\circ} 47'$ E., $7^{\circ} 35' 33''$ N., *Orthetrum contractum*, dated October 26, 1894, although by the map Dr. Smith was nearest this peak on October 15, while on October 26 he was fifty miles farther south.

Boran country, *Palpares* sp., No. 3, is merely dated April 8, 1895, at which time Dr. Smith was in the Boran country, near Higo, 4,480 feet elevation, $38^{\circ} 30'$ E., $4^{\circ} 27'$ N., and on that day had the severe fight with the natives which he describes on pages 195 *et seq.*

No Neuroptera of later date are included in the collection.

The previous literature on the Odonata of this region is a paper by Mr. Kirby,² recording six species (three identical with some of the present collection) from Dobar in the Goolis mountains and Bichen in Somaliland, while the writer has listed³ seven species from the Tana river.

² On some Dragon flies obtained by Mr. and Mrs. Lort Phillips in Somaliland. Proc. Zool. Soc. London, 1896, pp. 521-523.

³ Notes on the Odonata from East Africa, collected by the Chanler Expedition. Proc. U. S. Nat. Mus., xviii, pp. 143-145, 1895 (1896).

ODONATA.

1. *Enallagma*? sp.

One male from Sheikh Husein, September 29, 1894, has lost the last seven abdominal segments, so that a positive identification is at present impossible, but the remaining parts seem to indicate a relationship to such species as *glaucum* Burm. (*gabonense* Selys). The following descriptive notes are added to permit of future identification.

Frons, genæ, nasus, lips and rear of head pale green; rhinarium pale brown, vertex black from eye to eye, the site of the usual postocular spots is green confluent with the same color of the rear of the head.

Prothorax green on either side, and a middorsal black band half as wide as the prothorax itself.

Thorax pale green, a middorsal and a humeral stripe black, the latter half as wide as the pale antehumeral stripe, the former twice as wide as the pale antehumeral stripe; a short, narrow, black stripe at the upper end of the second lateral suture.

Femora pale green with an external (superior) black stripe. Tibiæ and tarsi yellowish, the former with an external (anterior) black line in their proximal halves.

Abdomen pale bluish-green, an uninterrupted middorsal black stripe on 1-3, widened and then suddenly narrowed before the apex of 2, narrowed at the base of 3.

Wings with the inferior sector of the triangle arising at least as far in front of the submedian cross-vein as the latter is long, quadrilateral with its upper side one-third as long as the lower side on the front wings, one-half on the hind wings, three antenodal cells, eleven postnodals on the front wings, ten on the hind wings, nodal sector arising near the fifth postnodal, ultranodal sector at the eighth. Pterostigma surmounting less than one cell; on the front wings black, with the lower and outer sides nearly equal; on the hind wings smaller, ochre, with the outer side distinctly longer than the lower.

Length of head, thorax and first three abdominal segments 12.5 mm., hind wing 19 mm.

The difference in the pterostigmata of the front and hind wings suggests *Ischnura*, but I notice something similar, although less marked, in a male of *glaucum* Burm. (*gabonense* Selys).

An apparently teneral female from Sheikh Husein, October 16, 1894, is probably of the same species as the above-described male; the last four and a half segments are wanting, and the specimen is otherwise in poor condition. The pale green of the male is replaced by pale luteous throughout. The black on the prothorax is but faintly indicated. The black humeral stripe is but a line, the middorsal stripe is narrower, so that it is hardly wider than the pale antehumeral, and it is bisected lengthwise by the middorsal carina being luteous. The two legs which remain (a first and a second) are pale yellowish. The left front wing has twelve post-nodals, the ultranodal sector rises at the ninth postnodal on all wings except the left hind. The pterostigma is very pale luteous on all wings, slightly smaller on the hind than on the front.

Length of head, thorax and first five abdominal segments 23 mm., hind wing 19 mm.

2. *Onychogomphus* sp.

One female, Berbera, July 5, 1894.

The females, at least of such East African species of *Onychogomphus* as *Genei*, *Hageni*, *pumilio*, *Costae*, *obliteratus* and *lacustris*, are difficult to identify from the descriptions in the absence of any specimens of this group. It seems possible that some of the differences indicated as specific may be due to age and to imperfect knowledge owing to the relatively few individuals examined. This being the case, I think it likely that this female from Berbera may be one of the species already described, in spite of the fact that it differs more or less from the descriptions. I prefer, therefore, not to give it any specific name, but to add notes which may facilitate its future identification.

Face and lips very pale yellowish, perhaps somewhat greenish in life, unmarked with black. Upper surface of frons pale yellow with a narrow basal brown line at the base of the vertex, and a group of 10–12 black denticles on either side at its front margin. Vertex yellowish, ocelli and the area between them and the antennæ (except the first joint) blackish. Occiput luteous, its hind margin armed with 16 black denticles.

Prothorax luteous. Thorax pale greenish-yellow, dorsum almost immaculate except for the trace of a pale brown antehumeral stripe; the humeral and the second lateral suture each with a

complete brown stripe and a short brown stripe on the site of the first lateral suture from the metastigma downward, where it joins that of the first lateral suture.

Legs pale green, femora with a superior pale brown stripe, first and second tibiae with one (anterior) brown line, third tibiae with two (anterior and posterior) tarsi brownish. Tarsal spines on all parts of the legs blackish.

Abdomen greenish yellow, a middorsal brown line on the basal third of 3-6, the articulations and the supplementary transverse carina (or suture) of 2-7 blackish, an inferior brown spot on either side of 3-6 in front of the supplementary carina and more or less confluent with it, an inferior apical brown stripe on either side of 2-7 which reaches forward to the supplementary carina on 2-4, a double middorsal apical brown spot on 5-7, a brown stripe on either side of 8 meeting its fellow of the opposite side both at base and at apex, narrow transverse basal and apical brown stripes on 9.

Eighth and ninth abdominal segments not at all dilated. Vulvar lamina brown, its emargination subquadrate. Appendages as long as 9, twice as long as 10, straight, slender, tapering, luteous, apical sixth brown. Eleventh segment ("anal tubercle") a little longer than 10, when viewed from above luteous.

Wings: reticulation mostly black or dark brown, except the yellow costa. Front wings with 12 (right), 13 (left) antenodals, 8 postnodals. Hind wings with 10 antenodals, 8 postnodals. First and fifth antenodals thicker. No basal subcostal cross-veins. Pterostigma pale yellow enclosed by thickened veins, surmounting 4-5 cells on the different wings. Membranule small, white.

Abdomen 32 mm., its appendages 1.5 mm., hind wing 27, pterostigma 3.5.

This female seems to have too much black on the abdomen to be *Genci*, *Costæ*, or *Hageni*, or perhaps even *lacustris*, and in this and other respects seems to resemble *obliteratus*, but this last has the pterostigma black. *Pumilio* is smaller and is differently proportioned in some of its parts. In addition to the older literature, Mr. McLachlan's paper in the *Entomologists' Monthly Magazine* for July, 1897, is to be consulted.

3. *Hemianax ephippiger* Burm.

One female, Berbera, July 4, 1894.

4. *Pantala flavescens* Fabr.

One female, Sheikh Husein, October 9, 1894.

5. *Palpopleura Portia* Drury.

One male, "Smith river, Sept. 11, 1894, F. G." [= Fred. Gillette?] is nearest *Portia*, but the dark brown coloring on the front wings does not reach the hind margin at any point, instead of occupying the entire width of the wing in its basal fourth, as in Drury's figure.

6. *Trithemis ardens* Gerstæcker.

Gerst., Mitt. Naturh. Mus. Hamburg, ix, p. 5, 1891.

One male, Stony brook, August 17, 1894.

In this individual there are, on the front wings, four posttrian-gular cells, then three rows to beyond the level of the nodus.

This species was originally described from Mbusini. I possess also a male from Abyssinia, given me at the Königliche Museum für Naturkunde, which I compared with the type of *T. Marnois* Brauer (*Verhd. zool. bot. Gesel. Wien*, xviii, p. 735, 1868, no description; see also de Borre, *Repertoire Alphabetique*, etc., p. 26) "aus Setith," and found the two to be identical. Dr. Karsch (*Berl. Ent. Zeit.*, xxviii, p. 24, 1893) has held *ardens* to be the same as *sanguinolenta* Burm., but they are quite distinct, as may be seen by comparing my description (*Trans. Am. Ent. Soc.*, xxv, p. 90, 1898) of Burmeister's types with Gerstæcker's description; it may be added that the supplementary sector next below the subnodal is so strongly convex posteriorly that two rows of cells exist between it and the subnodal sector in *ardens*, instead of one row as in *sanguinolenta*.

Mr. Kirby suggests (*Ann. Mag. Nat. Hist.*, 7, ii, p. 233, 1898) that "*T. ardens* Gerstæcker is, perhaps, a form of this species [i.e., *T. lacustris* Kirby] with blacker legs." A comparison of the original descriptions accompanying the two names shows the following differences:

	<i>Lacustris</i> Kirby. ⁴	<i>Ardens</i> Gerst.
1. Length of body	28 mm.	34-37 mm.
2. Alar expanse	48 mm.	56 (about) mm.
Antenodals—		
3. Front wings	9	13
4. Hind wings	6	9
Yellowish color at base of wings extends—		
5. On front wings	one-third of the length of the wing	to the triangle or one row of cells be- yond [<i>i.e.</i> , about one fourth of the wing length].
6. On hind wings	nearly to the nodus	$\frac{2}{3}$ to $\frac{3}{4}$ of the distance to the nodus.
7. Pterostigma	very pale yellow	blackish.

The above-quoted males are more like *ardens* than *lacustris*, although somewhat smaller and with slightly fewer antenodals than the former. Gerstæcker's description being briefer than Mr. Kirby's, it is not possible to determine whether the following features, in which these two males from Stony brook and from Abyssinia differ from *lacustris*, also exist in the typical *ardens*: front wings with internal triangle three-celled (instead of two), hind wings with 8-12 postnodals, three or four posttriangular cells, then two rows for two cells, then three rows increasing. It may be noted that Mr. Kirby (1898, *l. c.*) cites *lacustris* from Pretoria and Zoutpansberg in the Transvaal, from Wadelai and from Abyssinia.

7. *Crocothemis erythræa* Brullé.

Synonym. *Orthetrum Lorti* Kirby, Proc. Zoöl. Soc. Lond., 1896, p. 522; Ann. Mag. Nat. Hist. (7), ii, p. 233, 1898.

Three males, four females, Berbera, July 4 and 5, 1894. One male, Lafarok, July 13, 1894.

All eight individuals have the sectors of the triangle of the hind wings slightly separated at their origins, the maximum distance between them being about .2 mm.

⁴ Trans. Zoöl. Soc. London, xii, p. 329. 1889.

One of the three males from Berbera has the triangle of the hind wings crossed by one vein, and five rows of cells between the principal and nodal sectors at the level of the inner end of the pterostigma; these are two of the characters given as distinguishing *C. divisa* Baumann (*Ent. Nach.*, xxiv, p. 342, 1898), a West African species, from *erythræa*. On the other hand, the body is no more slender and the amount of yellow coloring at the base of the hind wings no less than in the other two Berbera males, which have the triangle of the hind wings free, and one of which has five rows, the other four rows of cells between principal and nodal sectors at the level of the inner end of the pterostigma. It seems very doubtful, therefore, that *divisa* is a distinct species.

It may here also be remarked that, on the page quoted from Baumann's paper, it is stated that "*ferrugaria* Ramb., Calv.," is the female of *erythræa*. I pointed out the differences between the two in *Proc. U. S. Nat. Mus.*, xviii, p. 127, 1896, and subsequently showed *ferrugaria* to be a synonym of *sanguinolenta* Burm. (*Trans. Am. Ent. Soc.*, xxv, p. 91, 1898).

8. *Pseudomacromia Donaldsoni* n. sp. (Pl. X, fig. 5.)

One male, Stony brook, August 17, 1894.

♂.—Dull bluish black except in those parts noted below. Vertex and most of the frons metallic violet, the lateral and inferior margins of the latter pale brown. Nasus blackish brown, darker in the middle. Rhinarium pale olive. Labrum shining black. Labium yellow, median lobe and inner halves of the lateral lobes black. Occiput black above, orange edged with black behind. Rear of the eyes black and yellow. Mesepisternum and metapleuron with some very indistinct, yellowish spots and stripes. Posterior half of metasternum black with a pair of bright yellow spots close to the median line. Coxæ and trochanters obscure brownish. Sides of first three abdominal segments pale brown, evidently much faded. It seems quite likely that in life there was a longitudinal yellow or brown streak on each side of the dorsum of 3-7, now almost completely faded.

Eyes meeting for a distance a little less than the antero-posterior middorsal dimension of the occiput. Tip of the vertex barely concave in outline when viewed from in front. Face clothed with black hairs, most numerous on frons and vertex. Frons without

carina, but the meeting of the two colors violet and brown nearly coincides with a more or less angular crest, best marked on the anterior surface. Hind lobe of the prothorax much smaller than the middle lobe, its hind margin entire.

Spines on all the femora directed toward the knee, 6 on the first, 9-12 on the second, 20-18 on the third; the spines on the third femora are shorter than the intervals separating them and noticeably shorter than the spines on the first or second femora; all these spines are of the antero-inferior (or outer) row, the postero-inferior row being composed of more numerous, slender hairs. Third tibiae with 12 antero-inferior (outer), 15 postero-inferior (inner) spines, longer than the intervals separating them. Claws of all the tarsi with the tooth distinctly shorter than the tip of the nail itself.

Abdomen, viewed from above, widest at 2 and at 6, slightly narrower at 3 and at 10. Genitalia of 2 quite prominent, especially the hamule which is entire, sickle-shaped, resembling, but more robust than, that of *Macrothemis*. Anterior lamina but little less prominent; viewed in profile, convex and polished in front, nearly plane behind; seen from behind its apical fifth is very distinctly bifid so as to show two tapering, rounded tips. Genital lobe at least half shorter than the hamule, oblong, apex rounded.

Superior appendages as long as 9, of the usual Libelluline form, with an inferior row of 8-10 denticles. Inferior appendage about one-seventh shorter, triangular, reaching beyond the denticles of the superiors.

Wings slightly smoky, milky at base to the arculus on the front wings, to the triangle on the hind wings. Pterostigma dark brown. Membranule pale brown, white at extreme base. Reticulation throughout blackish; nodal sector distinctly waved; two rows of cells between the subnodal sector and the next supplementary sector below; one submedian cross-vein; arculus between the first and second antenodals.

Front wings: 14 (right), 13 (left) antenodals, the last not continuous; 9 (right), 10 (left) postnodals, the first three not continuous; discoidal triangle with one cross-vein, internal triangle of three cells, three posttriangular rows to beyond the level of the nodus increasing to 4-5 marginal cells.

Hind wings: 9 antenodals, 11 (right), 9 (left) postnodals,

triangles free, its basal side a little nearer than the areculus, 3 post-triangular cells, then 2 rows for 2 to 3 cells, then three rows increasing to 13-14 marginal cells.

Total length 43 mm., abdomen 29, sup. app. 2, third femur 6, hind wing 35, pterostigma 3.

This species is very similar to *P. torrida* Kirby (*Trans. Zool. Soc. Lond.*, xii, p. 340, pl. lii, f. 7, 1889), which, however, is larger, having the total length of the body 58 mm., the wing expanse 100 mm., the pterostigma 5 mm., no milky color at the wing bases (at least none is mentioned in the description or shown in the figure), and the membranule white, while in spite of its larger size *torrida* has fewer antenodals and postnodals than *Donaldsoni*.

9. *Orthetrum contractum* Rambur.

Libellula c. Ramb., *Névr.*, p. 60, 1842. *O. c.* Calvert, *Trans. Am. Ent. Soc.*, xxv, p. 96, 1898, for full references.

One male, Walenso, October 26, 1894.

Pterostigma 3 mm. long. The brownish yellow alongside of the membranule of the hind wings extends outward for a width of two cells. Anterior lamina not as prominent as internal hamular branch. Sectors of the triangle of the hind wings arising from the same point.

Variety ?

One male, Walenso, October 26, 1894. Differs from the type-form in having but one row of cells throughout the entire area between the subnodal sector and the supplementary sector next below. In three males from Kilimanjaro, by Dr. Abbott,⁵ which I still have before me, this area consists of one row of cells throughout in six out of the twelve wings, while in the other six wings, one or more of which belong to each of the three individuals, there are one or two double cells inserted near the middle. This variety is therefore hardly worthy of a distinctive name.

10. *Orthetrum brachiale* Beauvois.

Libellula b., Beauv., *Ins. Recueil. Afr. Amer.*, p. 171, *Neur.*, pl. 2, fig. 3, 1805. *O. b.* Calvert, *Trans. Amer. Ent. Soc.*, xxv, p. 97, 1898 (with bibliography and synonymy).

One male, Berbera, July 4, 1894; no pruinose coloring.

⁵ Described by me in *Proc. U. S. Nat. Mus.*, xviii, p. 130, as *O. brachiale* Beauvois, although I have since shown this name to be incorrectly applied here.

Falls here by my key, *l. c.*, 1898, p. 95. I note, however, on the side of the thorax, in addition to the stripes described for *brachiale* (= *contractum* Ramb.) on p. 130, *Proc. U. S. Nat. Mus.*, xviii, a blackish stripe running through the spiracle (metastigma), and a similar one on the metepimeron parallel to and behind the second lateral suture and confluent, at its lower end, with the blackish color along the latero-ventral metathoracic carina; neither of these stripes reaches to the base of the wings. There are therefore six dark stripes on either side of the thorax, counting the antehumeral as one. A similar number and arrangement of stripes exists in a male from West Africa, given me by Mr. McLachlan, but which from the black color of the antenodals and other cross-veins should be *contractum*; this male is not at all pruinose, and its colors are in excellent preservation.

11. *Orthetrum Sabina* Drury.

Lib. S. Drury, Ill. Exot. Ins., i, pl. 48, f. 4, 1773.

One male (the last five abdominal segments missing) and one female, Berbera, July 4, 1894.

The race *africana* Selys (*Ann. Ent. Soc. Belg.*, xxxi, p. 22, 1887) is stated by him and by Mr. McLachlan (*Entom. Mo. Mag.*, 2, viii, p. 154, 1897) to differ from the typical *Sabina* in the following respects:

	<i>Sabina</i> Drury.	<i>Africana</i> Selys.
1. Labrum	pale brownish yellow	black, barely margined with pale yellow.
2. Sectors of the triangle in the hind wings	widely separated at their origin	arising from the same point.
3. Anterior lamina of the male	with a pencil of stiff hairs on either side	without the hairs of <i>Sabina</i> type
Habitat	China, Malaysia, Moluccas, New Guinea, Viti Is., India, Syria, Asia Minor, Cyprus,	Cameroon (West Africa).

Mr. McLachlan draws the conclusion (*l. c.*), "the two forms are not only distinct as species, but will probably eventually be placed in two different genera."

It is consequently of interest to note that the present male from Berbera agrees with *Sabina* in characters Nos. 1 and 2, with *africana* in No. 3. The distance between the origins of the two sectors of the triangle is about .5 mm., therefore the same as in *Sabina*; no trace of the hairs exists on the anterior lamina, whose anterior surface, moreover, is yellow instead of blackish as in the Asiatic males of *Sabina* which I have examined.

The female from Berbera has the labrum pale yellowish, the sectors of the triangle separated at their origin by a distance of .2-.3 mm., therefore less than in *Sabina*, the black line on the frons bordering the vertex and eyes is narrower than in *Sabina*, and the seventh abdominal segment has a large yellow spot on either side, at its middle, similar to the pair on 6.

12. *Sympetrum Fonscolombii* Selys.

One male, Sheikh Husein, September 29, 1894.

HEMISTIGMOIDES new genus.

(1) Vertex truncated at tip. (2) Frons with its upper surface sloping downward and forward from the vertex meeting its anterior surface at an angle of about 115° , the line of junction of these two surfaces being marked by a well-defined carina, (3) no lateral or other carinae. (4) Eyes in contact for a distance nearly equal to the middorsal length of the occiput.

(5) Hind lobe of the prothorax of equal width with the middle lobe, (6) its hind margin with a shallow median concavity and thus being slightly bilobed.

(7) Abdomen shorter than the hind wing, thickest at the third segment, thence tapering gradually to the tip, triangular in cross-section; (8) segments 2, 3 and 4 each with a distinct, supplementary, transverse carina.

(9) Femora armed with very short (except the last one to three) spines directed toward the knees; (10) tibiae with longer spines, those of the anterior row (thirteen) on the first tibia, of the posterior row on the second (twenty) and third (eighteen) tibiae being more numerous than those of the posterior (eleven) and anterior (ii, 9-11, iii, 13) rows respectively; this arrangement of the tibial

spines may be formulated thus: i *a* 13 *p* 11, ii *a* 9-11 *p* 20, iii *a* 13 *p* 18; (11) tarsal nails with the usual inferior tooth acute, much shorter than the tip of the nail itself.

All wings: (12) arculus between the first and the second antenodals, (13) one submedian cross-vein, (14) nodal sector very slightly waved, (15) at least some double cells between the subnodal sector and the supplementary sector next below, (16) one to three cross-veins between the median vein and the principal sector from the origin of the subnodal sector to the nodus, (17) discoidal triangles with one cross-vein.

Front wings: (18) last antenodal not continued to the median vein, (19) sectors of the arculus arising by a very short common stalk equal in length to the lower division of the arculus (*i. e.*, that part of the arculus from the origin of the stalk to the submedian vein), (20) one hypertrigonal, (21) triangle with its basal side twice as long as its anterior side, (22) internal triangle of three cells, (23) four posttriangular cells, then three rows to the level of the last antenodal, thence increasing, (24) submedian space reaching to the level of the fourth antenodal.

Hind wings: (25) sectors of the arculus arising by a common stalk which is almost as long as the arculus, (26) no hypertrigonals, (27) apex of the triangle not reaching outward (distad) to the level of the triangle of the front wings (it reaches to the level of the fourth antenodal of the hind wings), (28) triangle with its basal side in prolongation of the arculus, (29) three posttriangular cells, then two rows to the level of separation of the median and principal sectors, thence increasing, (30) sectors of the triangle arising from the same point, (31) four subbasal sectors (Kirby) start from the postcostal vein.

(32) Genitalia of second abdominal segment of male not prominent, (33) hamule bifid at tip only.

The insect for which this genus is established has a great superficial resemblance to the African *Hemistigma*, Kirby, a fact which has suggested the name here proposed. From *Hemistigma*, *Hemistigmoides* differs by the characters above numbered 1, 2, 5, 8, 15 (except in one wing out of twenty-four wings of *Hemistigma* studied for this purpose), 17 (for the hind wings), 19 and 27. It may be added here that two males, three females of *Hemistigma affinis* Ramb. have the arculus at the second antenodal (compare

No. 12 above), while one male of *affinis* has it slightly nearer the base of the wing than the second antenodal is. Further, although Mr. Kirby states in his original characterization of *Hemistigma* (*Trans. Zool. Soc. Lond.*, xii, p. 295, 1889) that the abdomen is "as long as the hind wings in the male," all three males of *H. affinis* just quoted have the abdomen shorter than the hind wing.

The genus *Bradinopyga* Kirby (*Journ. Linn. Soc. Lond. Zool.*, xxiv, p. 553, 1894), from Ceylon, is compared by its author to *Hemistigma*. *Hemistigmoides* differs from *Bradinopyga* in the characters above numbered 5, 16, 17 (for the hind wings), 19, 20, 27 and 30.⁶

In Dr. Karsch's arrangement of the genera of the Libellulinae (*Berl. Ent. Zeit.*, xxxiii, p. 356, 1890), *Hemistigmoides* would fall in the same section as *Perithemis*. It differs from *Perithemis*, however, by the characters above numbered 16, 20, 21, 24, 25 and 27.

13. *Hemistigmoides deceptor* n. sp. (Pl. X, fig. 4.)

One male, Sheikh Husein, September 29, 1894.

♂.—Vertex brown, its tip with a small metallic dark green spot. Upper surface of frons dark metallic blue-green, sides and anterior surface and the clypeus pale green. Labrum yellow, narrowly edged with black at the middle of the front margin. Labium yellow, a median line on the middle lobe and the inner edges of the lateral lobes dark brown. Occiput brown.

Prothorax dull blackish, middle lobe with a median twin spot and a small lateral spot—pale. Thoracic dorsum obscurely mottled with green and brown. Sides pale green with blackish brown stripes on the first (obsolete) and second lateral sutures, confluent below with the mostly dark pectus; this last has a pair of spots and behind them a transverse streak—all green—on the metasternum.

⁶ The structure of the prothorax of *Bradinopyga* is not mentioned by Mr. Kirby; his description states that the sectors of the triangle of the hind wings are separated at base, while his figure (*l. c.*, Pl. 41, f. 3) of *B. stigmata* Kirby shows them arising from the same point. Mr. Kirby has kindly informed me on both of these structures, by letter dated March 30, 1899, as follows: "In *Bradinopyga* the sectors of the triangle are *distinctly* separated, but not for more than a comparatively short space, which varies. In the type, the prothorax is not properly visible; but in a second specimen it seems to be shaped something like this: [here a sketch] *i. e.*, quadrilobate, the two central lobes sloping down on the sides, and the hind one *not divided* and considerably smaller."

Abdomen blackish, sides of 1-3 with some pale green, of 4-9 with a small indistinct yellowish-brown streak close to the lateral carinae. Genitalia of 2 inconspicuous; anterior lamina very slightly developed, its margin entire; hamule bifid at the extreme tip only, the anterior (inner) branch apparently hooked; genital lobe a little more prominent than the hamule, a little longer than wide, its tip regularly rounded.

Terminal abdominal appendages black; superiors about as long as 9 + 10, slender, thickest at four-fifths their length, with some inferior denticles, apex acute; inferior appendage reaching to slightly beyond the thickest part of the superiors.

Legs black, the under surfaces of the first femora, and of the second femora at base, and most of the trochanters pale green.

Wings: venation, including the costa, mostly black, but the antenodals and the cross-veins immediately below yellow. Pterostigma dark brown with a yellow spot on its inner half which does not, however, reach to the inner (proximal) end of the pterostigma. Membranule whitish.

Front wings: 12 antenodals, 7 postnodals, 6 marginal cells in the posttriangular field. Area between costa and median vein from base to pterostigma, the submedian space, apex of the wing from the pterostigma distad, and small areas above the hypertrigonal space and between the subnodal and principal sectors below the nodus—brownish yellow. Subcostal space from base to sixth antenodal (with slight "overflows" into the costal space), a spot at the nodus from slightly beyond the last antenodal to the first postnodal and from the costa to the median vein, and the area between the sectors of the arculus from their origin to the level of the triangle—blackish.

Hind wings: 9 (R) 8 (L) antenodals, 9 (R) 8 (L) postnodals, 10 (R) 12 (L) marginal cells in the posttriangular field. Subcostal (and adjoining part of costal) space to the third antenodal, the submedian space to beyond the cross-vein, the tip of the wing from the distal end of the pterostigma—brownish yellow. A black streak in the subcostal space from the base to the first antenodal.

Total length 33 mm., abdomen 21, front wing 28, its greatest width (at the nodus) 6; hind wing 26, its greatest width (at the fifth antenodal) 8; pterostigma 4, third tibia 4.5, superior appendages 1.75.

PLANIPENNIA.

Palpares sp. No. 1. (Plate X, fig. 1.)

One male, Lummo (Lummo?), August 12, 1894, is very close to *tristis* Hag., but differs (*a*) in having the subbasal spot on the hind wings, a spot which is lacking in *tristis*, and (*b*) in the form of the subbasal spot on the front wings. In (*a*) it resembles var. *niansanus* Kolbe (*Deut. Ost. Afrika*, iv, Netzflügler, p. 9, 1898), but differs therefrom in the greater extent of the second and third bands (Querbinde) of the hind wings; it is also larger than *niansanus*.

Palpares sp. No. 2. (Plate X, fig. 2.)

One female, The Haud, July 24, 1894, resembles Kolbe's figure (*l. c.*, f. 6) of *nyicanus* and McLachlan's description (*Journ. Linn. Soc. Zool.*, ix, p. 240, 1868) of *sparsus*.

Palpares sp. No. 3. (Plate X, fig. 3.)

One female [Boran country], April 8, 1895, related to *Stuhlmanni* Kolbe (*l. c.*, p. 12 and f. 1), and resembling *digitatus* Gerstaecker (*Mitth. Ver. Vorpomm.*, xxv, p. 117, 1894) in the markings of the hind wings.

Not having access to any other specimens of *Palpares*, and being therefore unable to appreciate the amount of individual variation which may occur in this genus, I have thought it preferable to designate these species as above, rather than to attach names to them, probably incorrectly.

The accompanying plate, from photographs which I owe to the kindness of Dr. Henry Skinner, will, it is hoped, enable students more favorably situated to exactly determine these *Palpares*.

TERMITINA.

Termes sp.

One soldier, without label.

EXPLANATION OF PLATE X.

Fig. 1. *Palpares* sp. No. 1. Actual length of body 53 mm., of hind wing 50 mm.

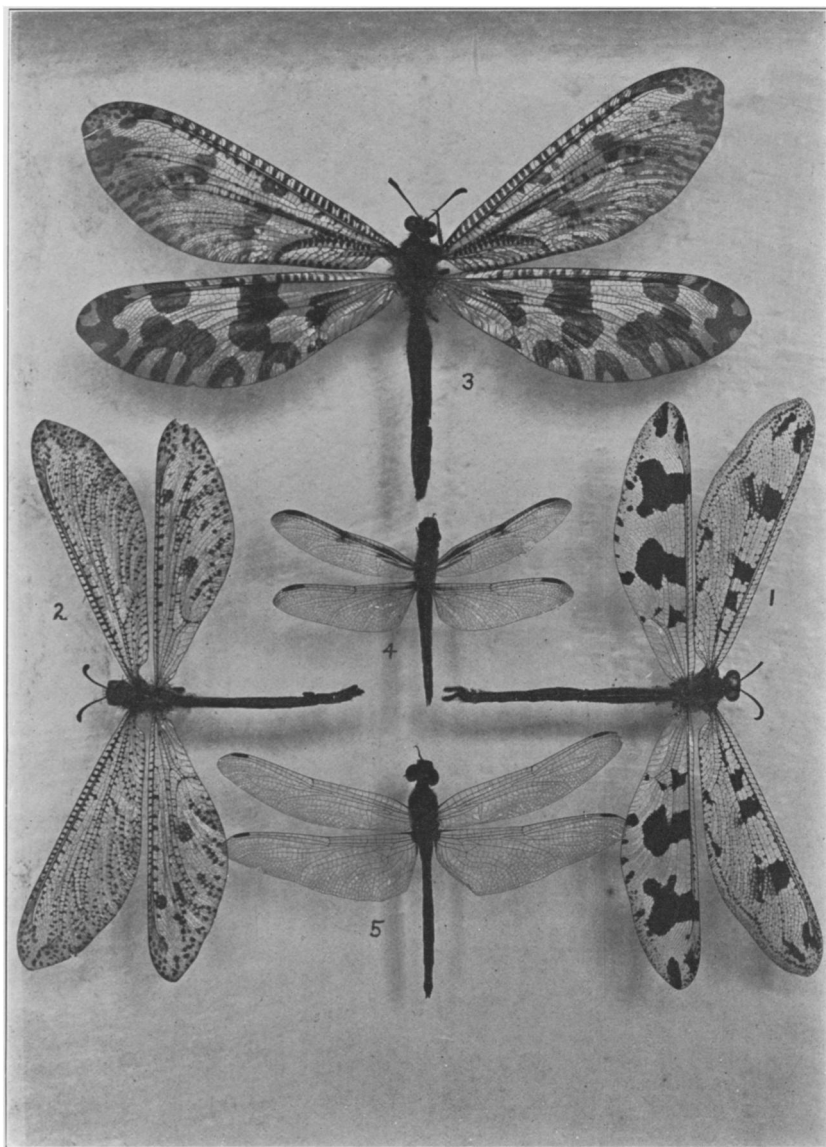
Fig. 2. *Palpares* sp. No. 2. Actual length of body 45 mm., of hind wing 47 mm.

Fig. 3. *Palpares* sp. No. 3. Actual length of body 49 mm., of hind wing 53 mm.

Fig. 4. *Hemistigmoides deceptor* n. gen. et sp. Actual length of body 33 mm., of hind wing 26 mm.

Fig. 5. *Pseudomacromia Donaldsoni* n. sp. Actual length of body 43 mm., of hind wing 35 mm.

All the figures, reduced in size, from photographs by Dr. Henry Skinner.



CALVERT. AFRICAN NEUROPTERA.